

Principles of Biology

Core Quiz #6

1. Important note: This is **not** the question that will be on the final core quiz, but an example of the type of question that will be on the final core quiz.

Two distinct seed colors were found in a population of corn plants: purple and colorless. Purple coloration results from synthesis of a purple pigment called anthocyanin in the seed coat. Seeds where anthocyanin is not produced in the seed coat are colorless.

Further investigation revealed that two enzymes are involved in the step-wise synthesis of anthocyanin. Furthermore, the two genes that coded for these two enzymes are variable—each has two distinct alleles. One of each gene's alleles codes for a functional enzyme, and the other codes for a nonfunctional enzyme. I represent each of these two genes and their two alleles as follows:

Gene 1:

E₁ - codes for functional form of enzyme 1

e₁ - codes for nonfunctional form of enzyme 1

Gene 2:

E₂ - codes for functional form of enzyme 2

e₂ - codes for nonfunctional form of enzyme 2

a. Perform the following cross using a punnet square: (These two genes are on different pairs of homologous chromosomes, hence assort independently.)

<u>male:</u>		<u>female:</u>
E₁ e₁	x	E₁ e₁
E₂ e₂		E₂ e₂

b. What is the probability that the above cross will produce offspring with colorless seeds?

c. What is the probability that the above cross will generate offspring that develop different colored seeds than the female parent?

Note: Figure 23-13 through Figure 23-16 show examples of two other two loci, two allele genetics problem. Furthermore, question 8 (d through h) on pg. 655 is another example of a similar problem that you may want to try before taking the core quiz.

Quiz will be given Thursday, **November 29th**.